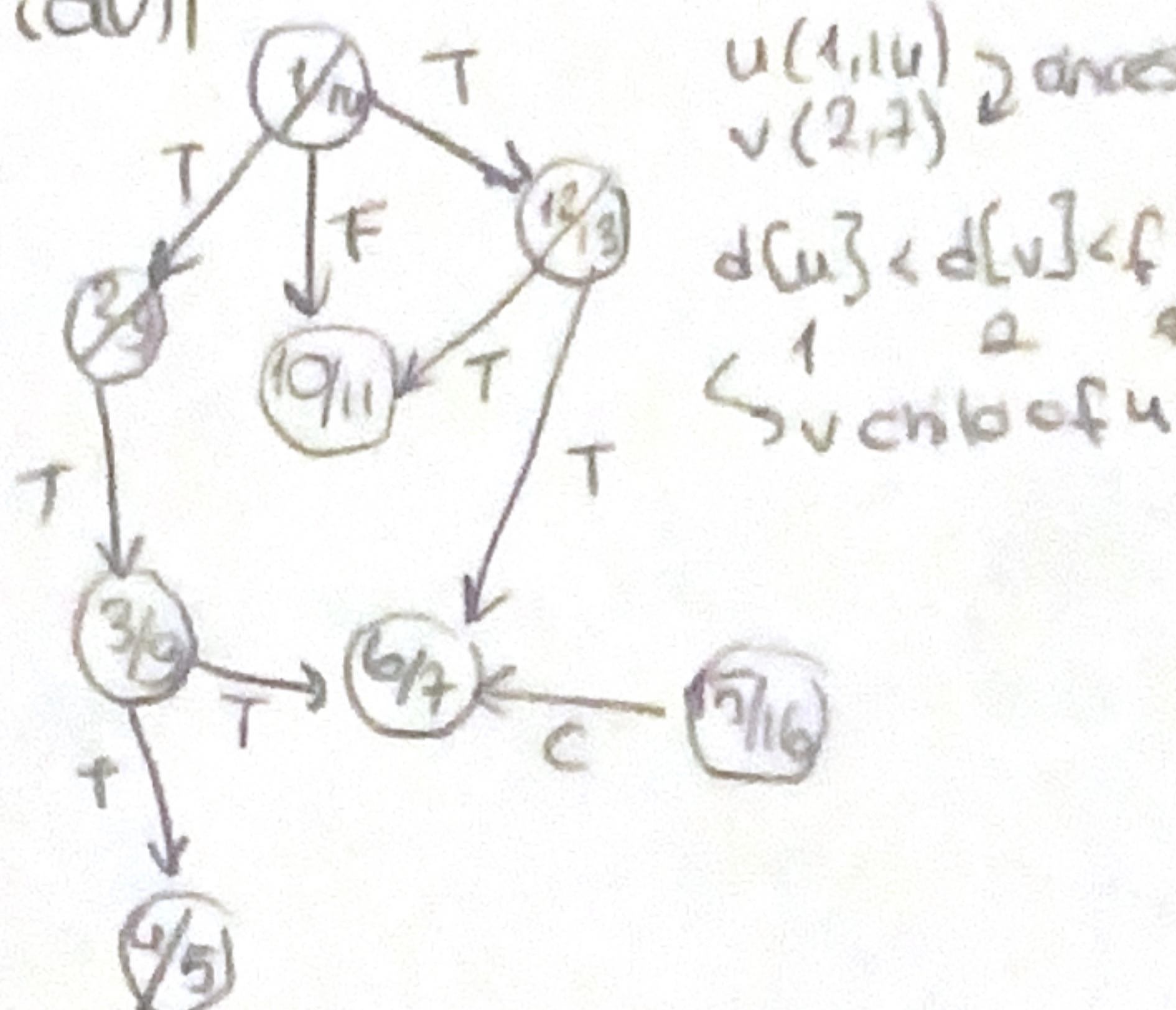
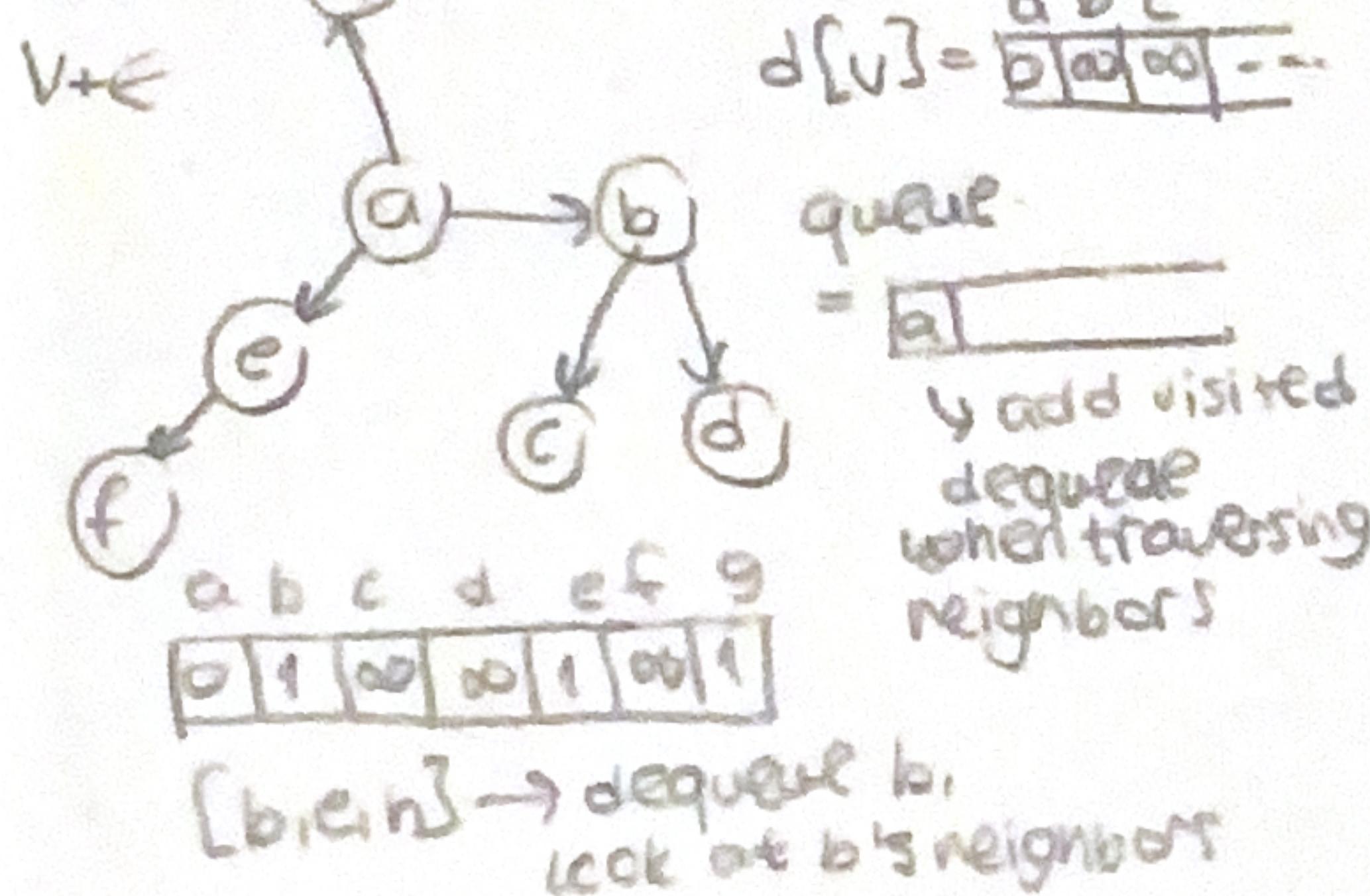


- DFS → Input $G(V, E)$
time $\Theta(V+E)$ | Output $d[V] \in F[V]$
space $\Theta(V)$



$u(1, u) \rightarrow$ ancestor
 $v(2, v) \rightarrow$ nodes
 $d[u] < d[v] < f[v] < f[u]$
 \downarrow
 $1 \quad 2 \quad 3 \quad 4 \quad 10$
 \hookrightarrow vchbof u

- BFS



MST

- Prim ($\Theta(V^2)$) (node selection)

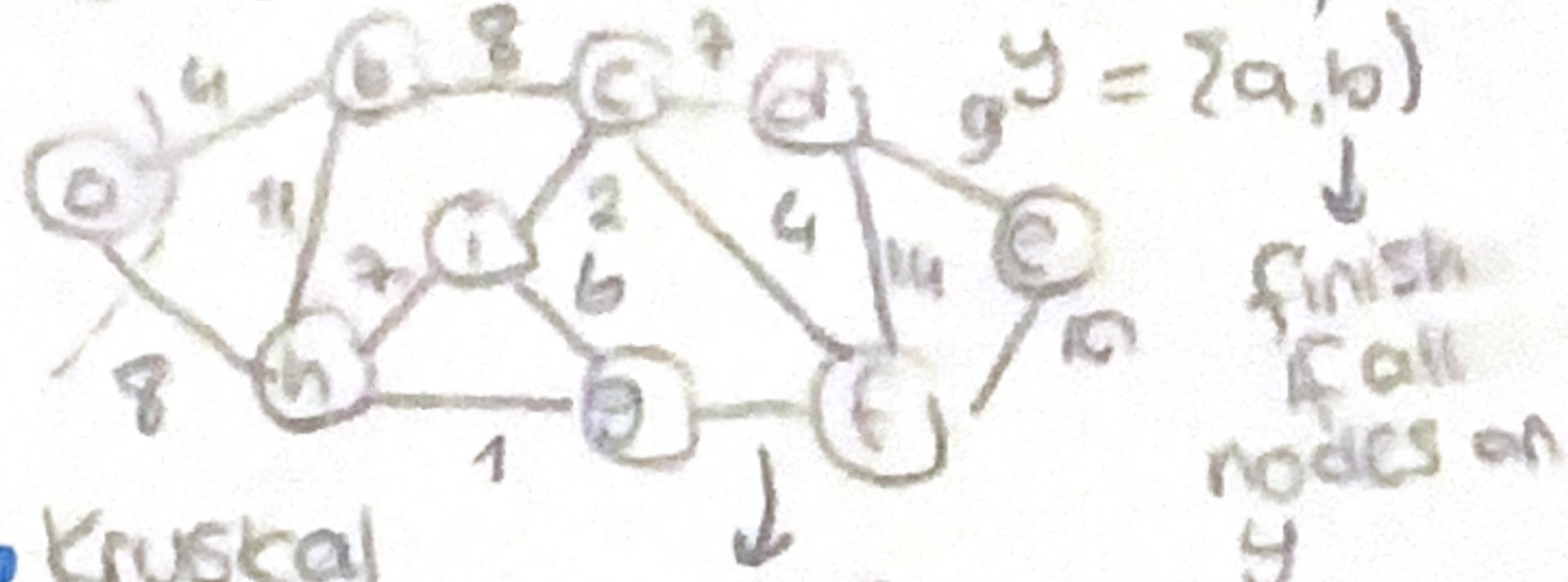
$F = \emptyset \rightarrow$ edges

$Y = \{a\}$

Pick b

$F = \{ab\}$

$Y = \{a, b\}$



Kruskal

$S = \{S_{0,1}, S_{0,2}, \dots, S_{0,n-1}\}$

$S = \{S_{1,2}, S_{1,3}, \dots, S_{1,n-1}\}$

$F = \{ng\} \rightarrow S = \{S_{0,1}, \dots, S_{n-1,n}\}$

edges

ng 1

gf 2

gi 2

$\Theta(|E| \log |E|)$

finish when all are one set

adj list

space $\rightarrow \Theta(|V| + |E|)$

\hookrightarrow pick if sparse

time $\rightarrow \Theta(|V| + |E|)$
 (drawing)

\hookrightarrow $|V| \rightarrow$ check edge

adj matrix

$a \rightarrow$ nodes space $\rightarrow \Theta(|V|^2)$
 $\{a \mid 0 \mid 0\}$ edges time $\rightarrow \Theta(|V|^2)$

$|V| \rightarrow$ check edge edge $\rightarrow \Theta(1)$

\hookrightarrow pick if dense

sparse $\rightarrow |V| \sim |E|$ (linear)

dense $\rightarrow |E| = \frac{|V||V|-1}{2}$

worst $\leftarrow |E| \sim \Theta(|V|^2)$

LCS

ABCDDFZ
 CEDDGZF

L	-	A	B	C	D	D	F	Z
-	0	0	0	0	0	0	0	0
C	0	0	0	1	1	1	1	1
E	0	0	0	1	1	1	1	1
D	0	0	0	1	2	2	2	2
D	0	0	0	1	2	3	3	3
G	0	0	0	1	2	3	3	3
E	0	0	0	1	2	3	3	3
F	0	0	0	1	2	3	3	3

Preorder \rightarrow NLR

Inorder \rightarrow LNR

Postorder \rightarrow LRN

- Huffman \rightarrow en kütükleri birleştir, ağacı oluştur (comp = $n + d \log d$)

Fixed encoding = $2^m \times 5$

3 olurdu, 5 var

- Selection Sort (n^2)

Find smallest and swap with first (then second)

7 3 2 6 1 9 5

1 3 2 6 7 9 5

1 2 3 6 7 9 5

Bubble Sort

Swap adjacent if wrong order

5 1 4 2 8 \rightarrow 1 5 4 2 8 ...

A swap with no pass ends the algo